جمهورية مصر العربية

وزارة التربية والتعليم
والتعليم الفني

نموذج إجابة

امتحان شهادة إتمام الدراسة الثانوية العامة

للعام الدراسى ٢٠١٦/٢٠١٧ ـ الدور الأول

المـادة : الديناميكا (باللغة الانجليزية)

نموذج

أ

من : الى	الدرجة
١ ← ٥	٧
٦ ← ٨	٦
٩ ← ١٢	٧
١٣ ← ١٦	٥
١٧ ← ١٨	٥
المجموع	٣٠ درجة

لكل مجموعة اسئلة متقدمة ومتأخرة

1-

(d) $2\ v\ x$ (1)

2-

(b) 2 (1)

3-

(i) $\because\ v = 6t - t^2$

$\therefore\ a = \frac{dv}{dt} = 6 - 2t$ ($\frac{1}{2}$)

at $t = 2 \quad \therefore a = 6 - 4 = 2\ m/sec^2$ ($\frac{1}{2}$)

(ii) $x = \int v\ dt$

$\therefore\ x = \int (6\ t - t^2)\ dt$ ($\frac{1}{2}$)

$= 3t^2 - \frac{1}{3}\ t^3 + c$ ($\frac{1}{2}$)

at $t = 0 \quad , \ x = 0$

$\therefore 0 = 0 - 0 + k$

$\therefore\ k = 0$ ($\frac{1}{2}$)

$\therefore\ x = 3t^2 - \frac{1}{3}\ t^3 \ \therefore\ x = 3(2)^2 - \frac{1}{3}\ (2)^3 = \frac{28}{3} meter$ ($\frac{1}{2}$)

another solution for (ii)

$\therefore\ x = \int_0^2 (6\ t - t^2)\ dt$ ($\frac{1}{2}$) $= \left(3t^2 - \frac{1}{3}\ t^3\right)_0^2 =$ ($\frac{1}{2}$)

$3(2)^2 - \frac{1}{3}\ (2)^3$ ($\frac{1}{2}$) $= \frac{28}{3} meter$ ($\frac{1}{2}$)

4-

(c) 30000 kg. m/sec (1)

5-

(b) 7.68 (1)

6-

(c) acceleration $1.2\ m\ /\ sec^2$ upwards (1)

7-

First : on air $\because\ v^2 = u^2 + 2\ g\ S$ $(\frac{1}{2})$

$\therefore v^2 = 2 \times 9.8 \times 1.4$

Inside the Sand

$\because v^2 = u^2 + 2\ g\ S$

$\therefore\ 0 = 2 \times 9.8 \times 1.4 + 2a \times 0.1$

$\therefore a = -137.2\ m\ /\ sec^2$ $(\frac{1}{2})$

$\because mg - \mu = m \times a$ $(\frac{1}{2})$

$\therefore 9.8\ m - 225 \times 9.8 = m \times -137.2$

$\therefore 147\ m = 225 \times 9.8$

$\therefore m = 15\ kg$ $(\frac{1}{2})$

Another solution

$\because P - P_\circ = w$ $(\frac{1}{2})$

$\therefore m\ g\ S_1 + (m\ g - \mu)S_2 = 0$ $(\frac{1}{2})$

$\therefore m\ g\ (S_1 + S_2) = \mu\ S_2$

$\therefore m = \frac{m\ S_2}{g\ (S_1 + S_2)}$ $(\frac{1}{2})$

$m = \frac{225 \times 9.8 \times 0.1}{9.8 \times 1.5} = 15\ kg$ $(\frac{1}{2})$

8-

First :

$\because v = u + a\,t$

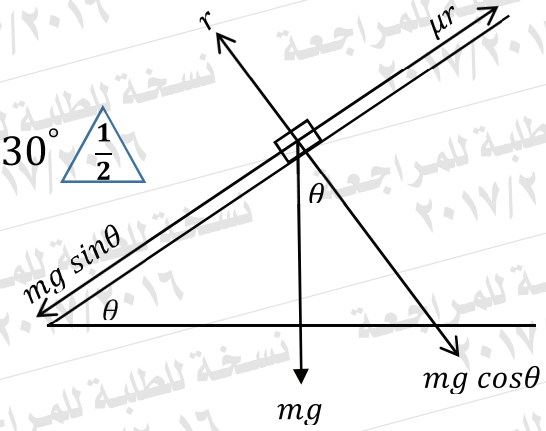
$0 = 14.7 + \frac{3}{2}\,a$

$\therefore a = -9.8\ m/sec^2$ $\frac{1}{2}$

$\because r = mg\cos 30°$, $\frac{1}{2}$

$-\mu\, r - m\, g \sin 30^\circ = m\, a$

$\therefore -\mu \times m\, g \cos 30^\circ - m\, g \sin 30^\circ = 9.8\, m$ $\frac{1}{2}$



$\therefore \frac{\sqrt{3}}{2}\,\mu - \frac{1}{2} = -1$

$\therefore \mu = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$ $\frac{1}{2}$

second:

$\because \tan\lambda = \frac{\sqrt{3}}{3}$, such that : λ is the angle of friction $\frac{1}{2}$

$\therefore \lambda = \theta = 30^\circ$ $\frac{1}{2}$

$\therefore$ The body is about to slide.

9-

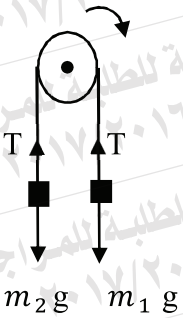
(d) $10^5\ Newton$ (1)

10-

(a)

$m_1 g - T = m_1 \times a \implies (1)$ $\frac{1}{2}$

$T - m_2 g = m_2 \times a \implies (2)$ $\frac{1}{2}$



From 1 and 2 By adding

$\therefore\ m_1 g - m_2 g = (m_1 + m_2)a$ $\frac{1}{2}$

$\therefore\ 980(m_1 - m_2) = 196(m_1 + m_2)$ $\frac{1}{2}$

$\therefore\ 5(m_1 - m_2) = (m_1 + m_2)$ $\frac{1}{2}$

$\therefore\ 4\, m_1 = 6\, m_2$

$\because m_1 : m_2 = 3 : 2$ $\frac{1}{2}$

b)

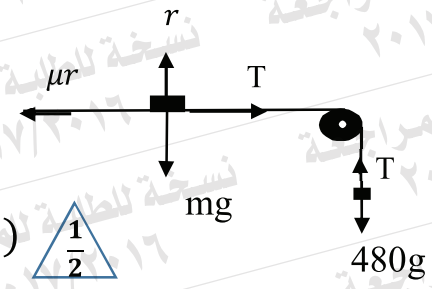
$r = m\, g$

$\therefore r = 500 \times 980$

$480\, g - T = 480\, a \implies (1)$ $\frac{1}{2}$

$T - \mu\, r = 500\, a$

$\therefore T - \frac{2}{5} \times 500 \times 950 = 500a \implies (2)$ $\frac{1}{2}$



From 1 and 2 by adding

$480 \times 980 - 200 \times 980 = 980\, a$

$\therefore a = 280\ cm / sec^2$ $\frac{1}{2}$

from (1) $\therefore T = 480 \times 980 - 480 \times 280 = 336000$ Dyne $\frac{1}{2}$

$P = 2T \cos 45^\circ$ $\frac{1}{2}$

$= 2 \times 336000 \times \frac{\sqrt{2}}{2}$

$= 336\,000\sqrt{2}\ Dyne$

$= 3.36\sqrt{2}\ Newton$ $\frac{1}{2}$

11-

(a) 45 (1)

12-

$\because m_1 v_1 + m_2 v_2 = m_1 \acute{v}_1 + m_2 \acute{v}_2$ $\left(\frac{1}{2}\right)$

$\therefore 100 \times 50 - 50 \times 30 = 100 \acute{v}_1 + 50 \times 40$

$\therefore \acute{v}_1 = 15\ cm / sec$ $\left(\frac{1}{2}\right)$

$\because I = m_2(\acute{v}_2 - v_2)$ $\left(\frac{1}{2}\right)$

$= 50\ (40 + 30)$

$= 3500 gm.cm / sec$ $\left(\frac{1}{2}\right)$

13-

(b)105 (1)

14-

(a) $\frac{1}{64}$ (1)

15-

(c) 39 (1)

16-

$\because \overrightarrow{S} = \overrightarrow{AB} = \overrightarrow{B} - \overrightarrow{A}$ $\left(\frac{1}{2}\right)$

$= (\ 3\ ,4\ ) - (-1\ ,2)$

$= (\ 4\ ,2\ )$ $\left(\frac{1}{2}\right)$

$\because W = F\ .\ S$ $\left(\frac{1}{2}\right)$

$\because W = (\ 6\ ,-3\ ).(4\ ,2)$

$W = 24 - 6 = 18$ work unit $\left(\frac{1}{2}\right)$

17-

$\because power = F \times v$ (1/2)

$\therefore 30 \times 75 = F \times 54 \times \frac{5}{18}$

$F = \frac{30 \times 75}{15} = 150\ kg.wt$ (1/2)

The velocity is uniform

$\therefore R = F = 150\ kg.wt.$ (1/2)

the resisitance per each ton $= \frac{150}{6}$

$= 25\ kg.wt\ /\ Ton$ (1/2)

18-

(a)

$\because T - T_\circ = W$ (1/2)

$\therefore \frac{1}{2} m v^2 = (mg \sin\theta - r)S$ (1/2)

$\therefore \frac{1}{2} \times 0.2 \times v^2 = 0.2 \times 9.8 \times \frac{3}{S} \times S - r\,S$ (1)

$\therefore 0.1\, v^2 = 0.6 \times 9.8 - 4.48$ (1/2)

$\therefore v^2 = 14 \quad \therefore v = \sqrt{14}$ m/sec (1/2)

(b)

$MD = 130 \cos\theta = 130 \times \frac{12}{13} = 120\ cm$ (1/2)

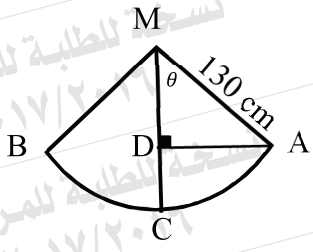
$\therefore CD = 10\ cm$ (1/2)

$\because T_c + P_c = T_a + P_a$ (1/2)

$\therefore 0 + \frac{1}{2} m v^2 = 0 + m g S$ (1/2)

$\therefore \frac{1}{2} v^2 = 980 \times 10$ (1/2)

$\therefore v = 140\ cm\ /\ sec$ (1/2)



انتهت الإجابة وتراعى الحلول الأخرى